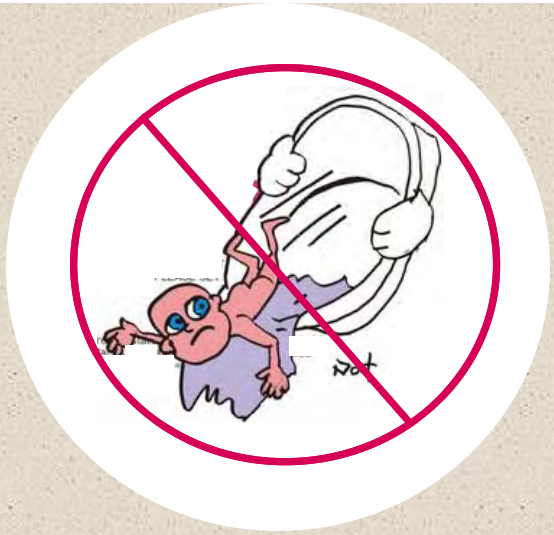
Keeping the Baby, Recycling the Bathwater

Highly Functional

Cost Effective

Retrofit Milking Parlors



2009 Winter Dairy Management *Dairy Modernization* Series

Collin McCarthy, NWNY Dairy Team & John Conway, PRO-DAIRY

A Huge

to Dr. Dave Kammel, University of Wisconsin

for use of many of his slides in this presentation

BIOLOGICAL SYSTEMS ENGINEERING

University of Wisconsin - Madison

College of Agricultural and Life Sciences

New York, like Wisconsin Family Dairy Farms…

- Are all unique
- Have modernized or adopted technology over time
- Have been growing in size
- Have adapted their own unique combination of facilities, management, and labor to make a profitable enterprise


Tie Stall Barn


Grazing


Freestall and Parlor

Common Goals

- **Economic**
  - Manage Debt Load
  - Low Capital Cost
  - Improve Profitability
- **Labor**
  - Reduce Physical Labor
  - Milk in a Reasonable Amount of Time
  - Improve Labor Efficiency
  - Use Existing Labor Force
  - Hire Labor as Needed

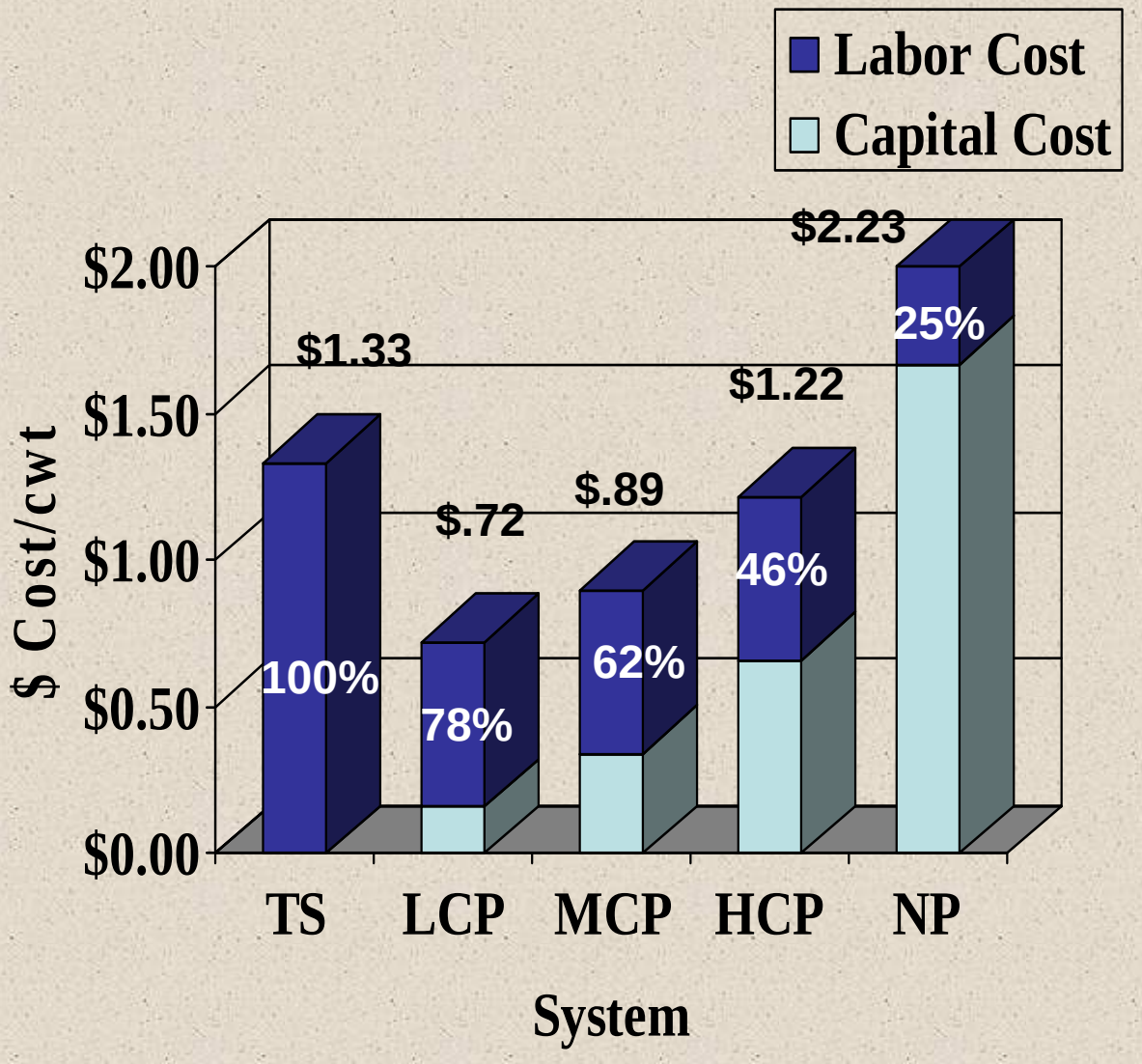
Common Goals

- Quality of Life
  - Increase Family Time
  - Reduce Fatigue
- Health
  - Improve Milker Health and Safety
- Transition In/Out
  - Allow Senior Partner to Exit Operation
  - Allow New Partner to Enter Operation

Right to the bottom line…

Parlor Capital and Annual Costs

- Tie Stall
  - $35,040/year labor
- Low Cost Remodeled Parlor
  - $25,000-capital
    - ($2,808 annual)
  - $14,600/year labor
- Medium Cost Remodeled Parlor
  - $50,000-capital
    - ($5,832 annual)
  - $14,600/year labor
- High Cost Remodeled Parlor
  - $100,000-capital
    - ($11,448 annual)
  - $14,600/year labor
- New Parlor
  - $250,000
    - ($28,944 annual)
  - $14,600/year labor



How do you make this…….

...look like this?

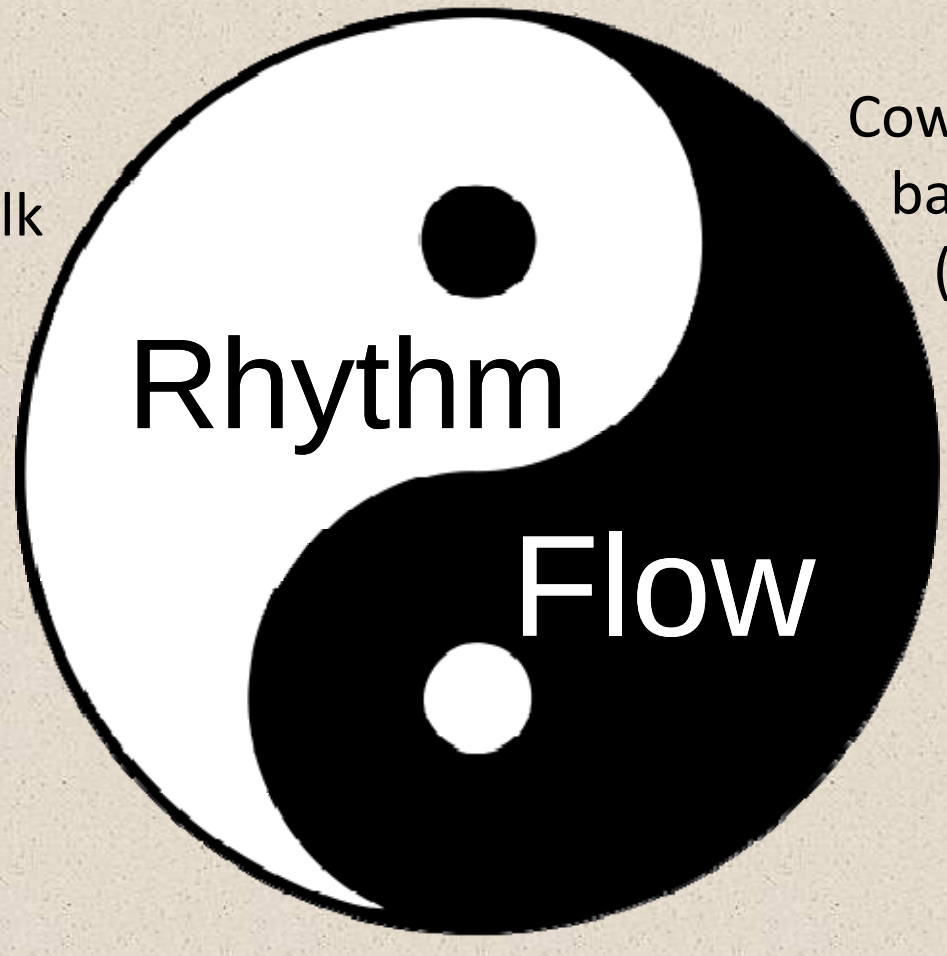
Keeping costs as low as possible is good business… but what about the “Highly Functional”?

Milking System Design Considerations –

- Happy people make happy cows and vice versa
- It pays to get lighting right
- Easy entrance an absolute must
- Traction, traction, traction!
- Avoid exiting bottlenecks
- Balance parlor, group and holding area size for best throughput
- Don’t forget ease of equipment maintenance and repair
- No one (cows or humans) likes noise
- Climate control directly relates to “happy cows & people”

The Tao of Milking Cows

Milkers Milk



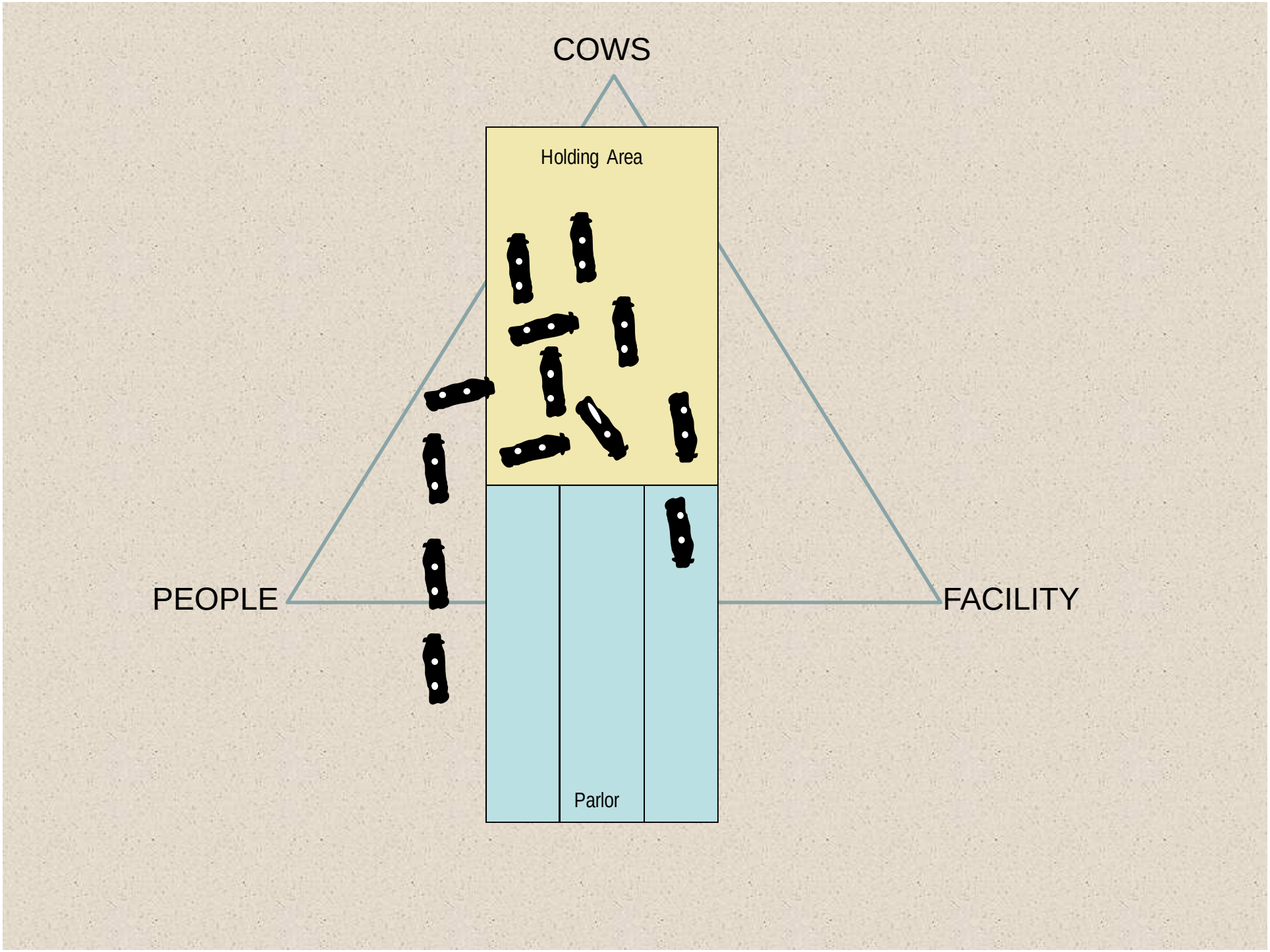
Cows move from the barn to the parlor (and back) with minimal human intervention

Labor is transferred from humans to cows and interact only at the udder

The Tao of Milking Cows

Rhythm and Flow help prevent the cardinal sins of milking:

- Entering the holding area
- Hose usage in the parlor
- Hollering, hitting, hating
- Rushing - trying to work faster than a cow
- Leaving the pit to assist in the Flow


COWS
Holding Area
PEOPLE
FACILITY
Parlor

Milking System Design Considerations –

Happy People Make Happy Cows and vice versa

✧"Upward Spiral" of positive experiences leads to:

- fluid movement of cows into parlor
- quick/full milk letdown, complete milkout
- fluid movement away from parlor
- less manure left behind

Parlor design figures hugely in creating that "upward spiral".
Here's how…

Milking System Design Considerations –

It Pays to Get Lighting Right

- ✧ Cows balk at entering dark areas
- ✧ People more alert, better mood (atrium effect)
- ✧ Much easier to see udders, teat ends, abnormal milk, early feet problems, etc.

Milking System Design Considerations –

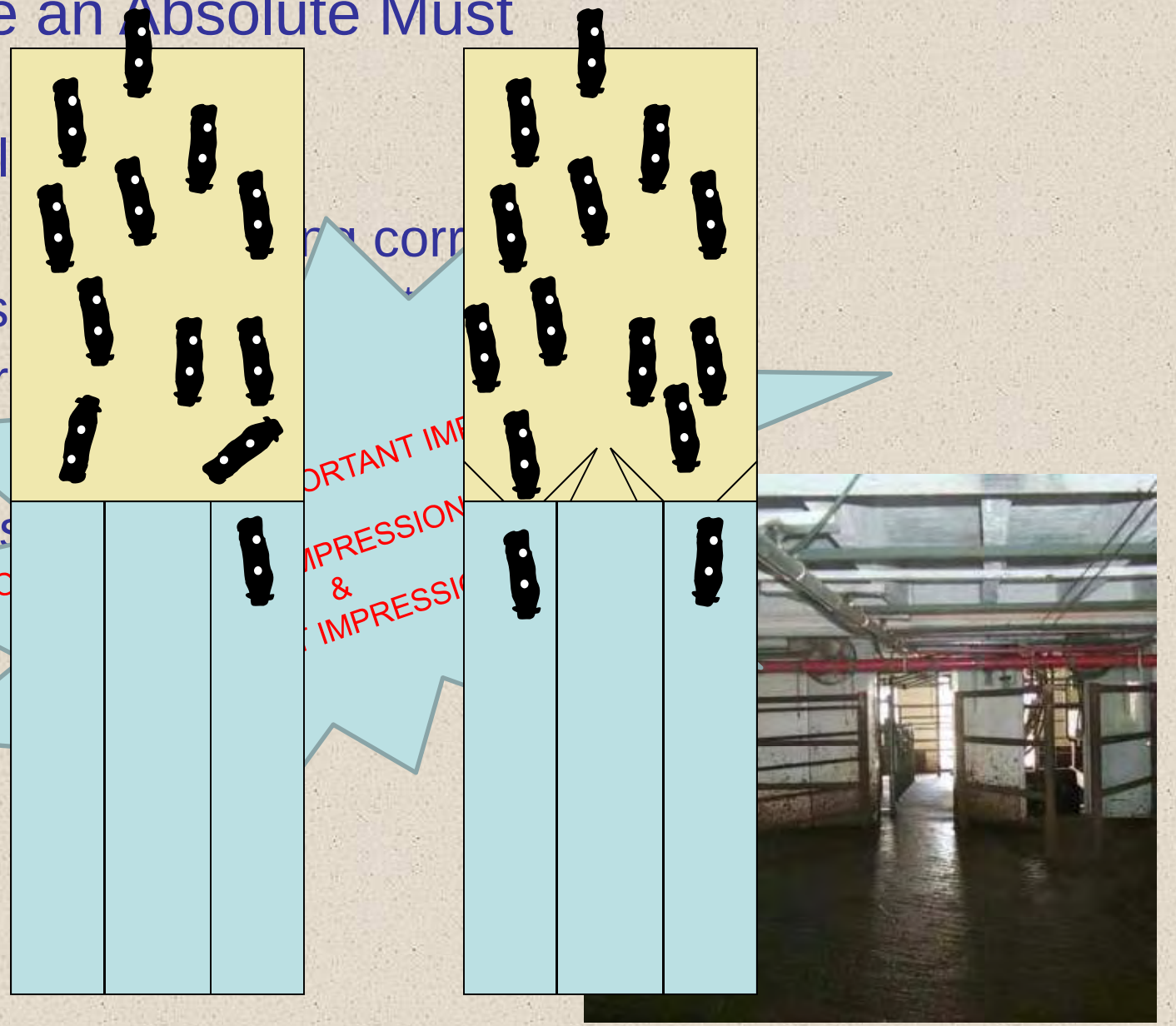
Holding Area

- Entrance must be in the back- cows detest sharp turns
- Wide gates minimize cow to post contact and allow for equipment entry
- Fans, fans, and more fans

Milking System Design Considerations –

Easy Entrance an Absolute Must

- ✧ Avoid steep sl
- ✧ Funnel ‘em in
  - -especially us
  - -less need for
  - -minimizes
- ✧ Seriously cons
  heifers th
  “model” cow



Milking System Design Considerations –

It Pays to Get Lighting Right

- Cows balk at entering dark areas
- People more alert, better mood (atrium effect)
- Much easier to see udders, teat ends, abnormal milk, early feet problems, etc.
- Provide lighting in holding area too!

Crowd Gates

- Always use electricity (ALWAYS)
- Crowd gates are area reducers, not cow pushers
- Solid gates = no escape
- Non-solid gates (chains or pipes) need to be permeable to a cow on the run
- Don’t need to cost a fortune

Milking System Design Considerations –

Traction, Traction, Traction!

- Eliminate slippery floors; cows *and* people
- Even minor injuries to either at very least reduces efficiency, at worst leads to career shortening serious injuries

Milking System Design Considerations –

It Pays to Get Lighting Right

- Cows balk at entering dark areas
- People more alert, better mood (atrium effect)
- Much easier to see udders, teat ends, abnormal milk, early feet problems, etc.
- Provide lighting in holding area too!

Milking System Design Considerations –

Avoid Exiting Bottlenecks

- Whether you go with traditional single file exit, rapid exit or individual exit it's essential to provide space for clearing gates or getting around slow or idle cows
- Nothing is more frustrating to a milker than losing 10 minutes each time side loading is delayed by cow traffic bottlenecks. Efficiency goes seriously down the tubes.
- Worse yet is scared or frustrated cows who contribute to unwanted shoving, slipping or falling

Milking System Design Considerations –

Balance Parlor, Group and Holding area Size for Best Throughput

- Balance is achieved when no cow is away from her pen for more than 1 hour.
- Cows comfortably back “home” eat, drink, rest and produce more milk

Don’t Forget Ease of Equipment Maintenance & Repair

- Keep key routine maintenance points clean and well-lit especially:
  - -receiver groups (transfer pump motors, sanitary traps, drain shut offs and receiver jars
  - -all rubber parts (gaskets, flapper valves, drain hoses, pinch valves, etc.
  - -pulsators and fresh air filters
- Before wedging a transfer pump into a corner, imagine needing to change a seal during milking in a puddle of putrefied milk!

Milking System Design Considerations –

No one (Cows or Humans) Likes Noise

- Strive to get vacuum pumps, air valve exhausts and other mechanical noise makers away from the pit and parlor.
- Some good measures:
  - -can the milker hear the weather report on the radio without really cranking the volume
  - -can a conversation be held without the need for shouting
- Rubber bumpers strategically placed can substantially dampen the sound of swinging gates

Milking System Design Considerations –

Climate Control Directly Relates to “Happy Cows & People”

- In winter supplemental heat will:
  - -keep the milker warm (and upbeat)
  - -prevent freezing during the wash cycle (helping to avoid high PI counts and loss of quality premiums)
  - -prevent frozen wash hoses and subsequent late starts
- In summer mechanical cooling will:
  - -vanquish flies
  - -keep lungs filled with fresh air
  - -help sustain morale

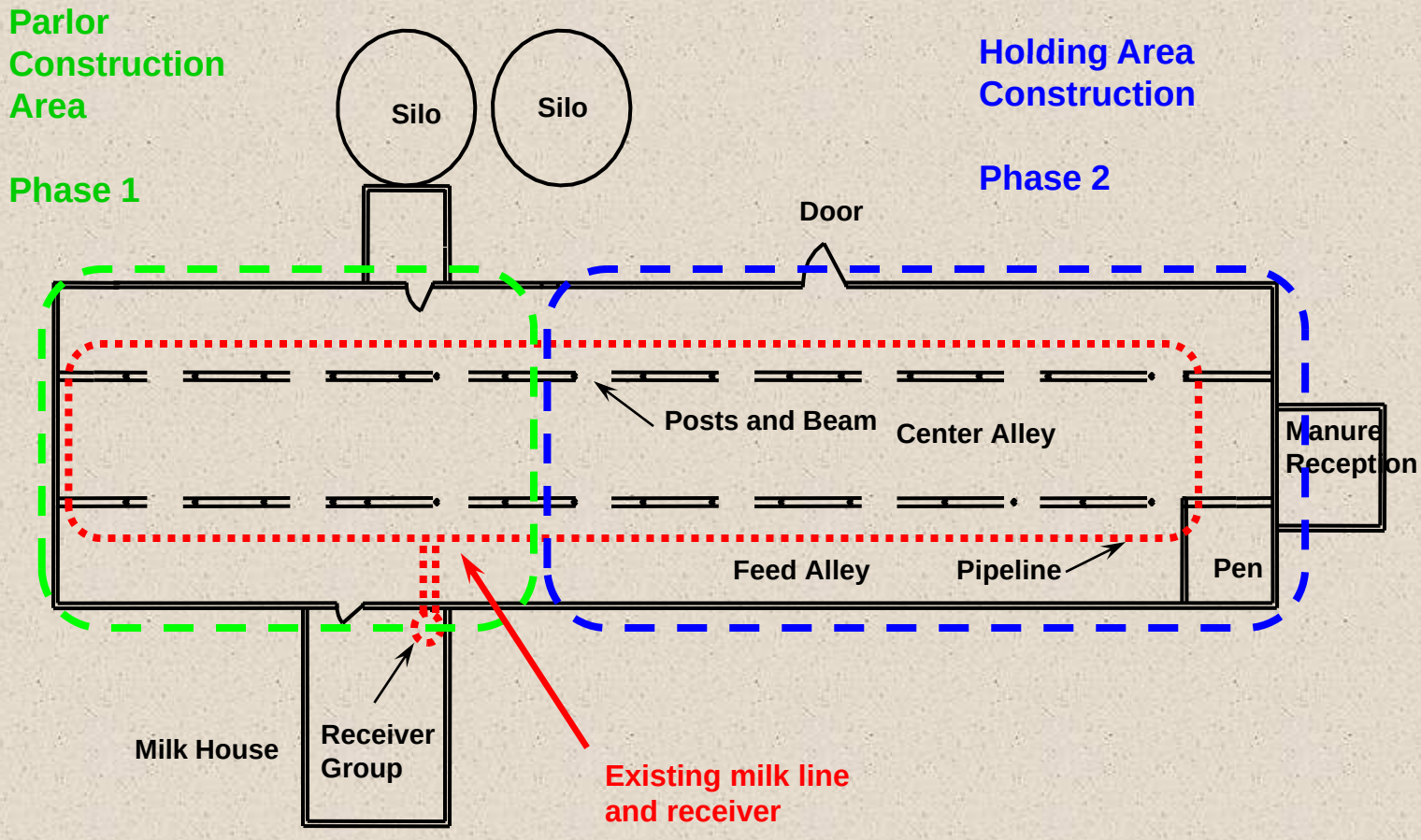
Benefits of the Highly Functional *and* Cost Effective Parlor "Package"

- ✧Minimized cow injuries
- ✧Minimized worker fatigue
- ✧Contributes to optimal cow productivity
- ✧Contributes to optimal worker output
- ✧Animal & human welfare concerns a non-issue
- ✧High probability of hitting profitability "sweet spot"!

Parlor Cost per Milking Stall
2008 Dollars

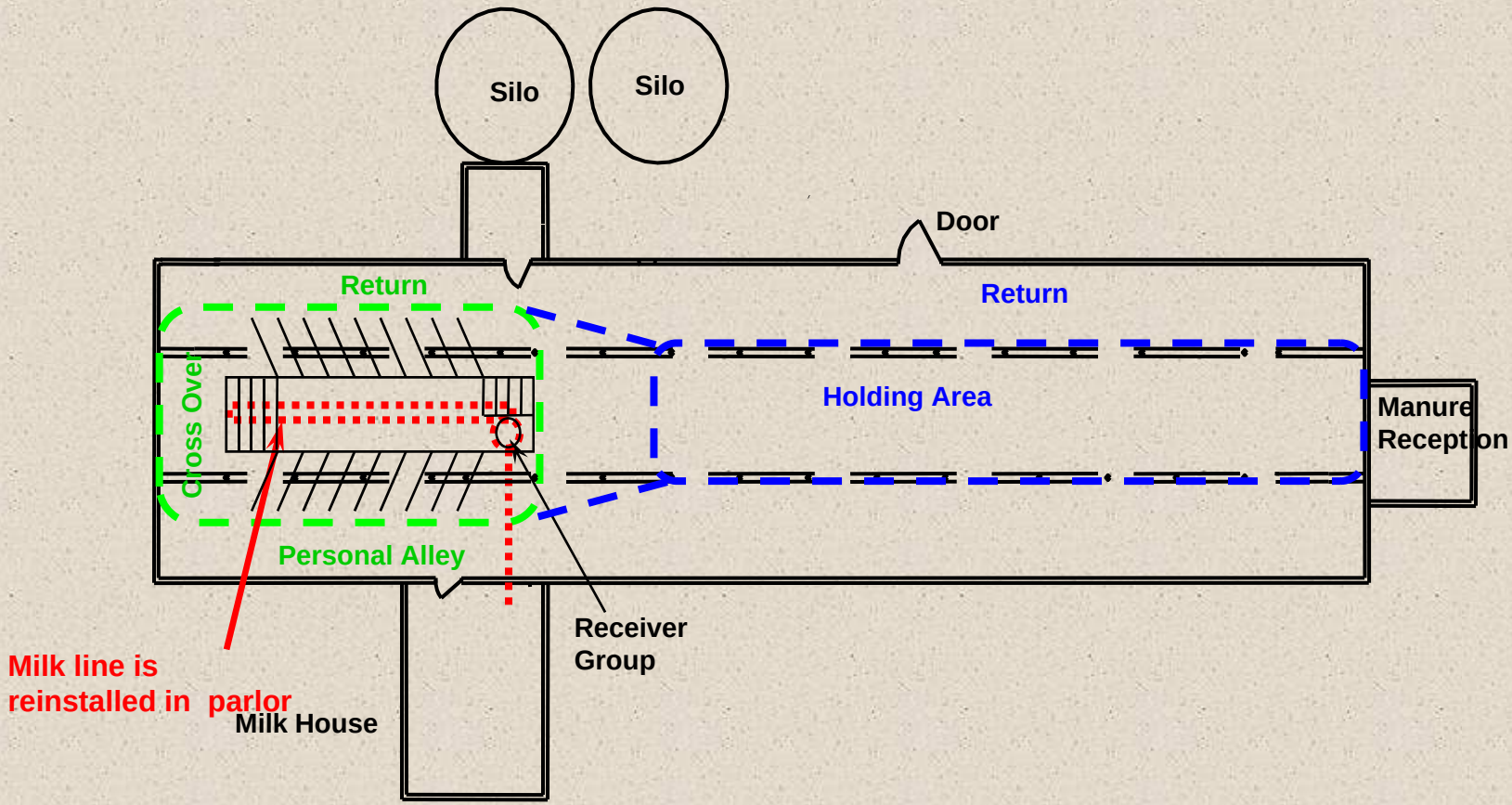
Parlor Stall Type	Retrofit Construction (n=55)	New Construction n= 34
Flat barn	$3,360 (n=6)	NA
Herringbone	$9,657 (n=8)	$18,769 (n=3)
Parabone	$3,845 (n=30)	$6,016 (n= 10)
Parallel	$7,478 (n=11)	$22,361 (n=18)

Existing Stall Barn

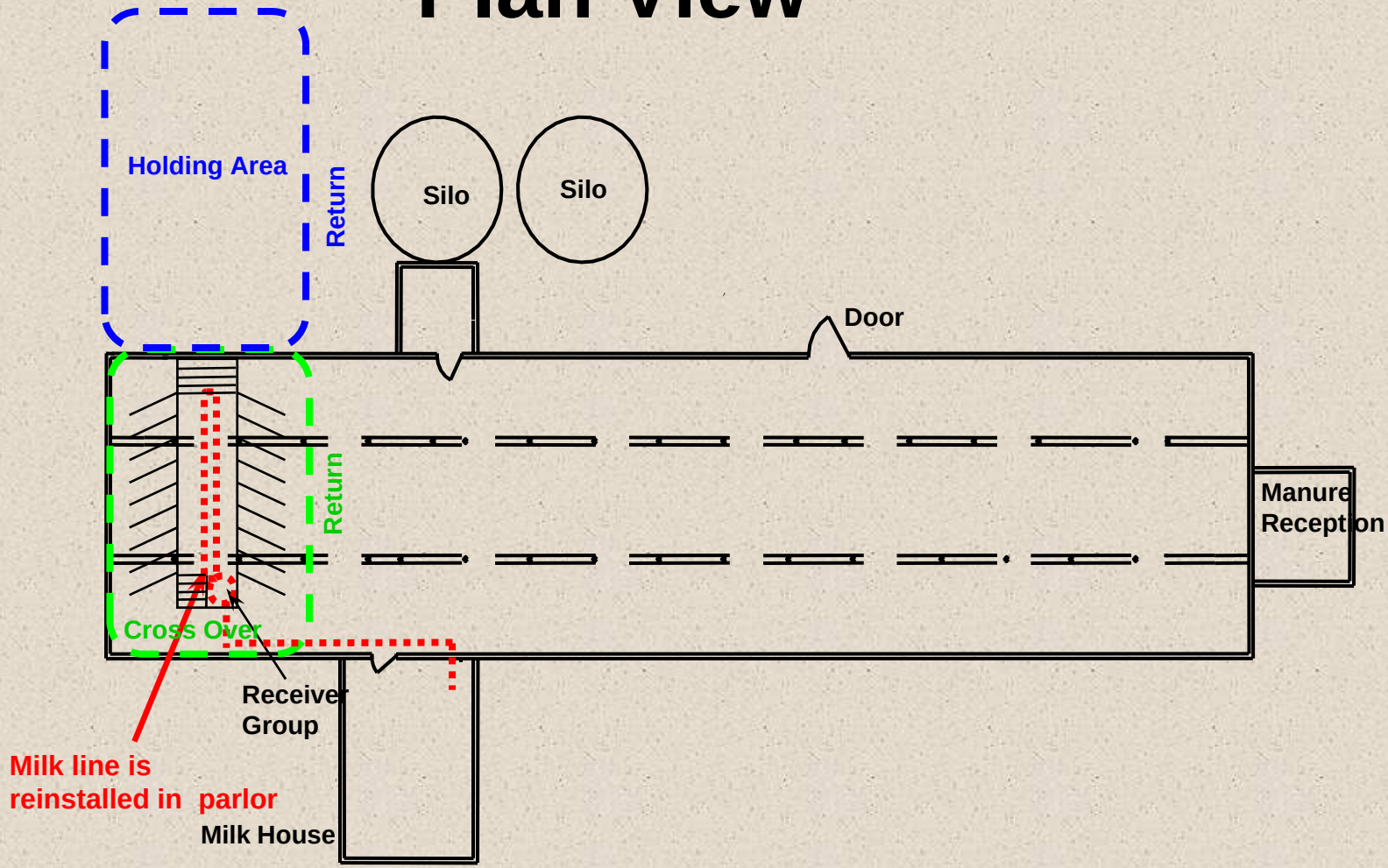


Plan View
Existing Tie Stall Arrangement

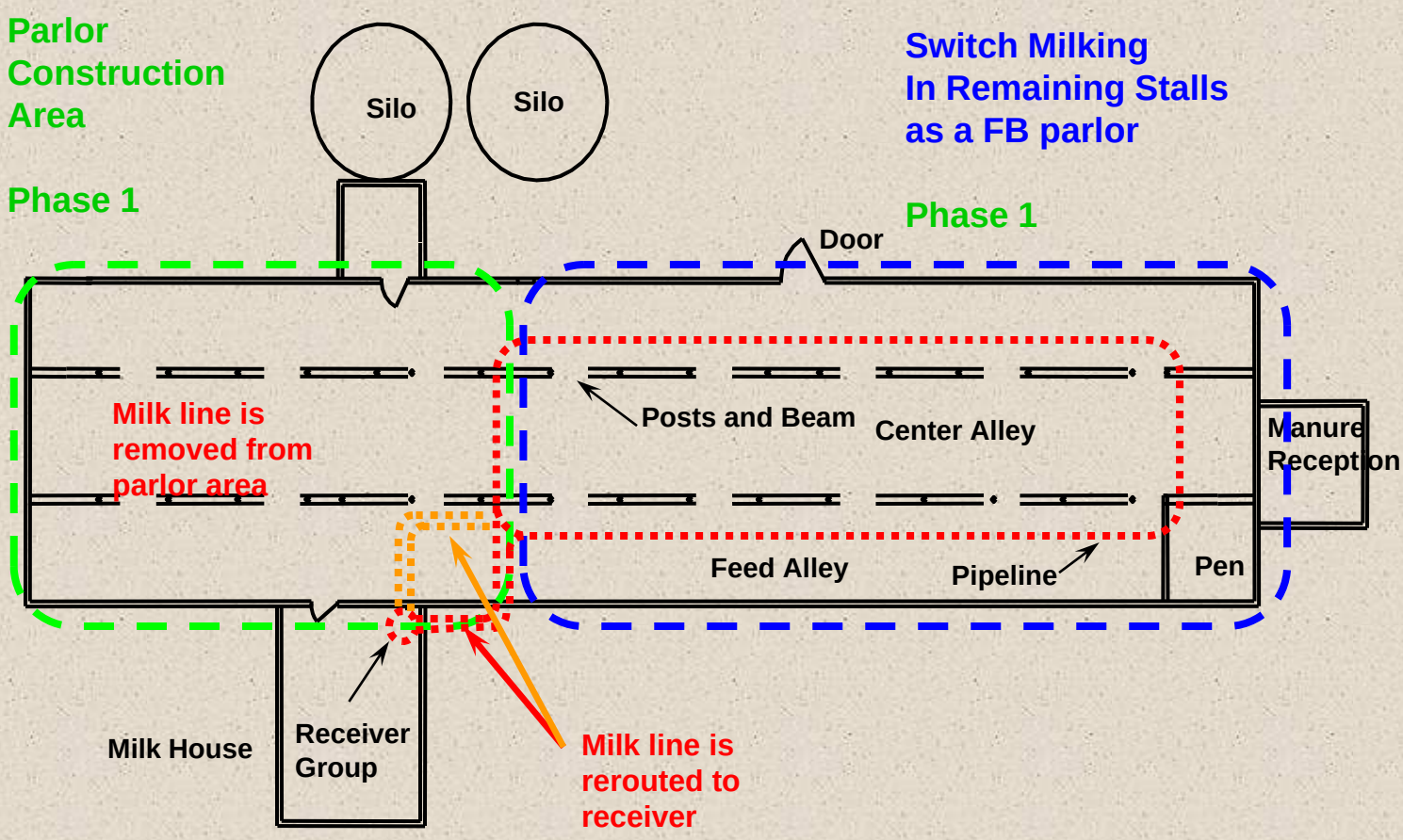
Centered Parlor Layout
Plan View



Cross Ways Parlor Layout
Plan View



Temporary Milking Arrangement (Switch Milking)



Temporary Tie Stall Arrangement
Phase 1

Demolition

If in doubt…
…. remove it

Excavation

Plumbing and Heating

Concrete Placement

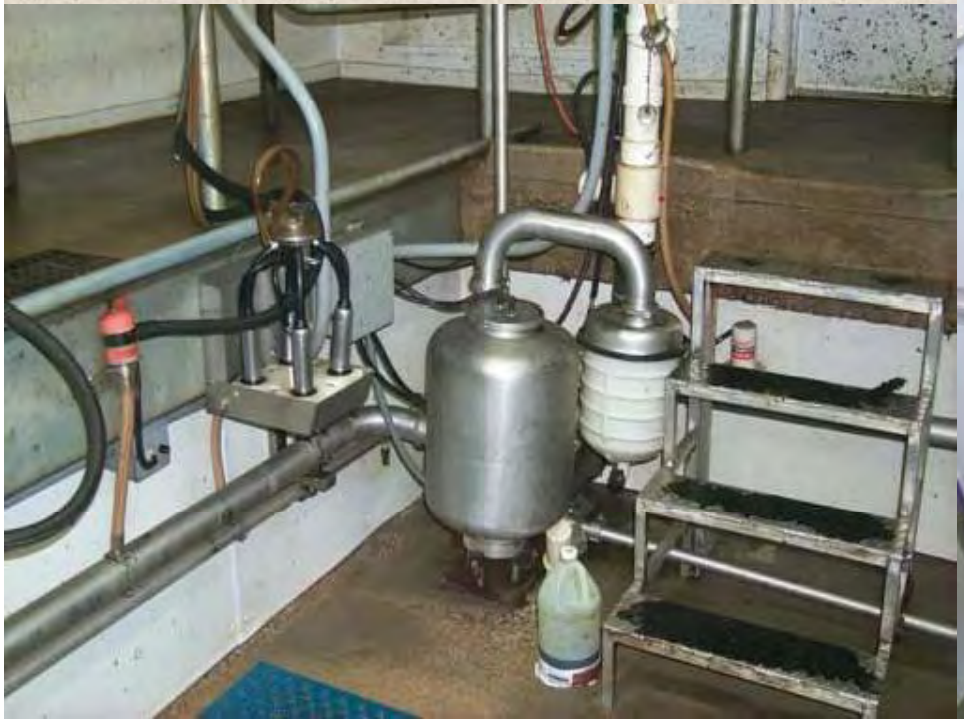
Concrete Placement

Milking Stall Installation

Low Milk Line

Swing Milk Line

Milking System Receiver Group



Milking System Installation (CIP)

Milking System Installation (No CIP)

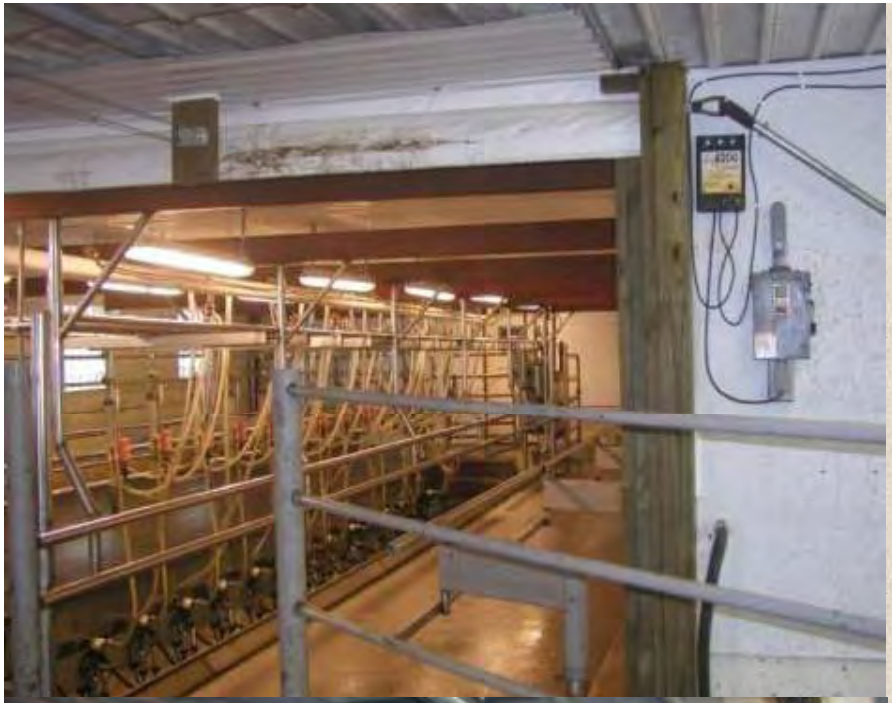
Finish Carpentry

No ATOs

ATOs
Slider

ATOs
Swing

Lighting



Holding Area Entrance Curtain

Holding Area Entrance Doors

Exit Chop Gates

Exit/Entrance Swing Gates

Crowd gates (Cheap)

Crowd gates (Economical)

Parlor Waste

Milk House

Minimal Changes

Bulk Head Tanks
Utility Space
Upgrade Equipment

$1,000 Parlor

$1,000 Truck

$17,000 Parlor

$17,000 Truck

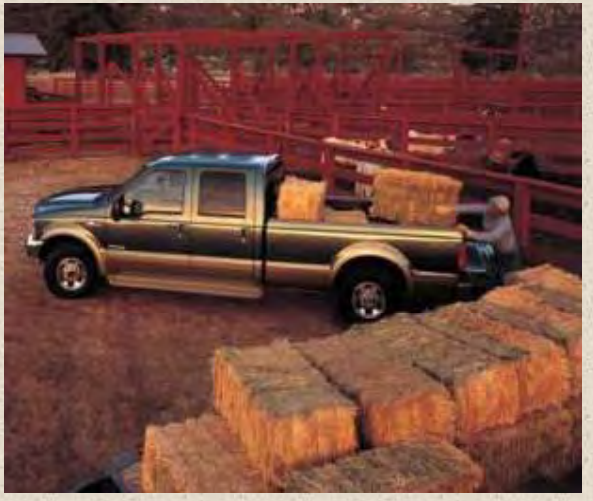
$25,000 Parlor

$25,000 Truck

$30,000 Parlor

$30,000 Truck

$50,000 Parlor



$50,000 Truck

$100,000 Parlor

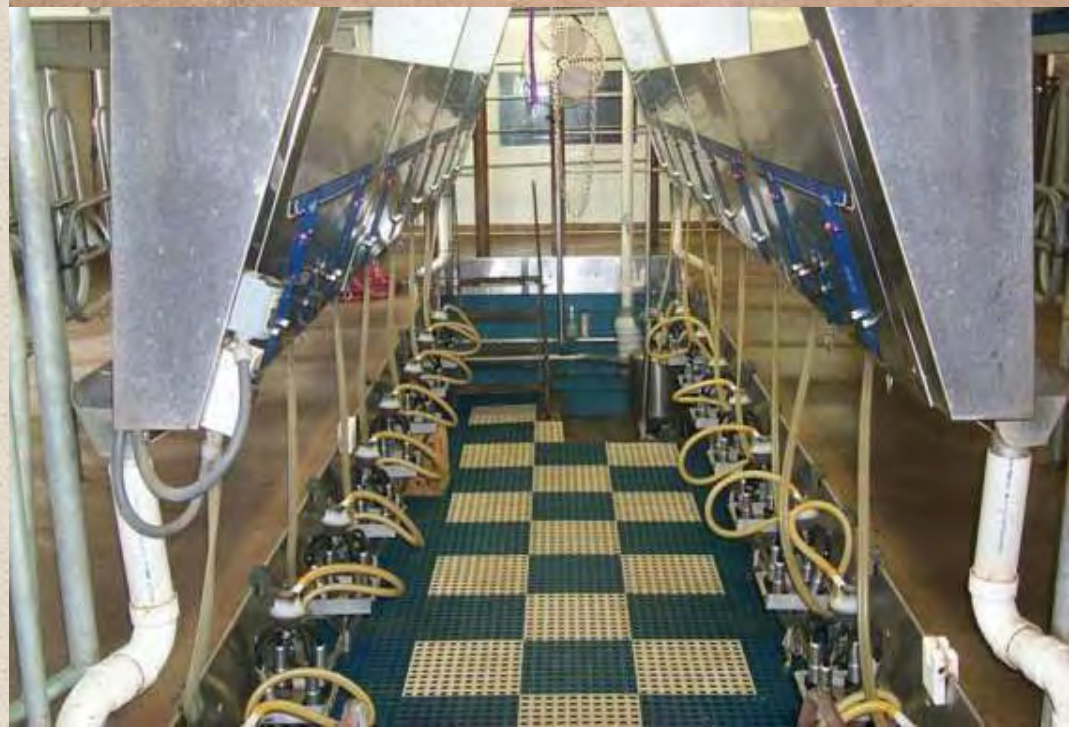
$100,000 Truck

$150,000 Parlor

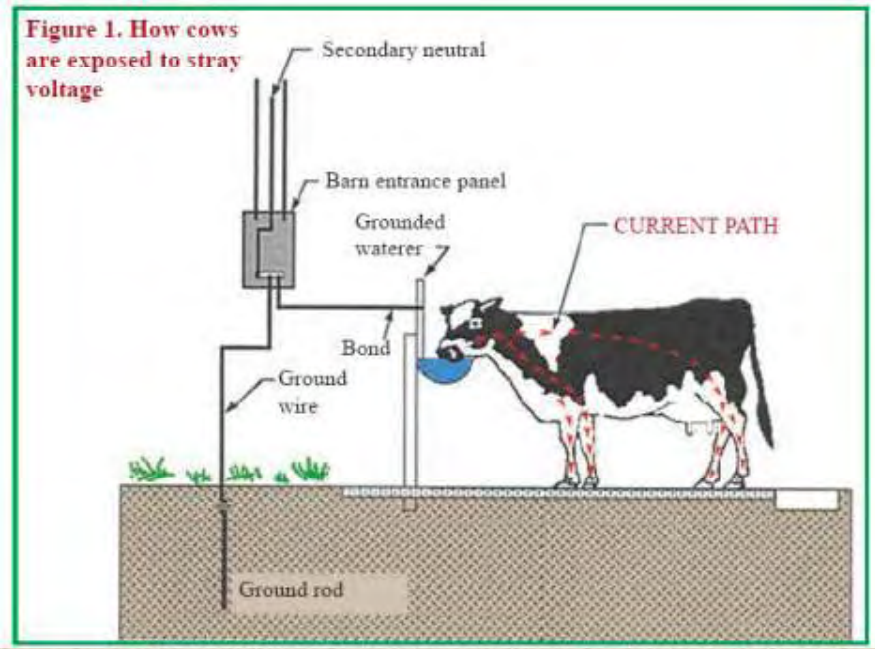
$150,000 Truck?

$500,000 Parlor

$500,000 Truck?



“Be careful out there”… sage advice when it comes to the vagaries of stray voltage



Risk Factors:

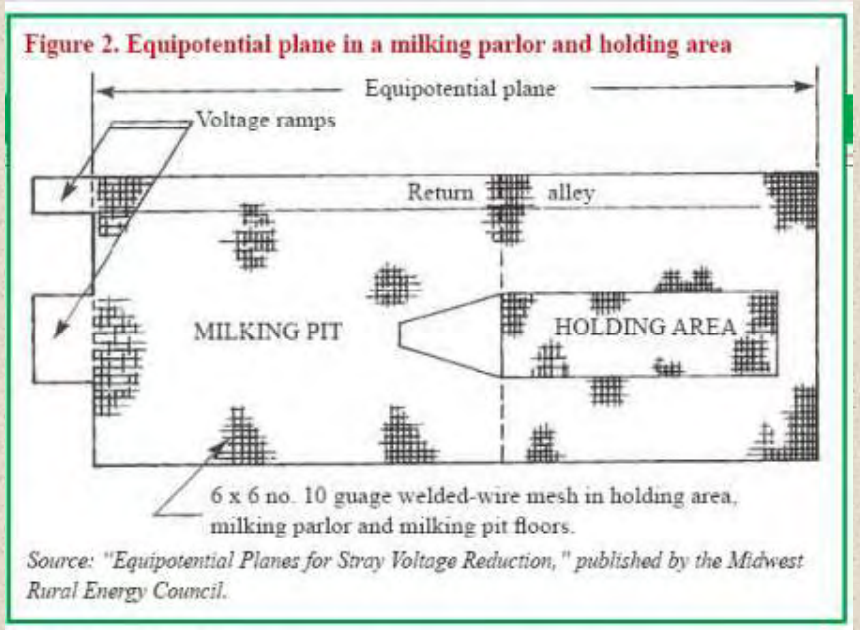
- End of line
- Bare concentric neutral (wire wrapped around hot leg and into soil)
- Variable Frequency Drives
- Age of system
- Type of service
- Multiple grounded neutrals

Dr. Steve Carlson, DVM and Dairy Producer, SE Iowa

“Be careful out there”… sage advice when it comes to the vagaries of stray voltage

Cow Level Signs:

- Immuno-suppression (including Hemorrhagic Bowel Syndrome)
- Feet – rock back on heels, overgrown toes
- Legs/hocks inexplicable rough look
- Water trough shyness and “four-at-a-time-dilute-the-pain” drinking
- “Defecation without Provocation” in parlor
- Death
- Inexplicably hard-to-heal sores



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“Be careful out there”… sage advice when it comes to the vagaries of stray voltage

Herd Level Signs (after exhausting other causes of same symptoms):

- Excess lameness
- Poor reproduction
- Poor milk production – high or low components
- High turnover rates
- Poor fresh cow performance
- Immuno-suppression
- Seasonal variation in performance (herd drops under ___ weather conditions)

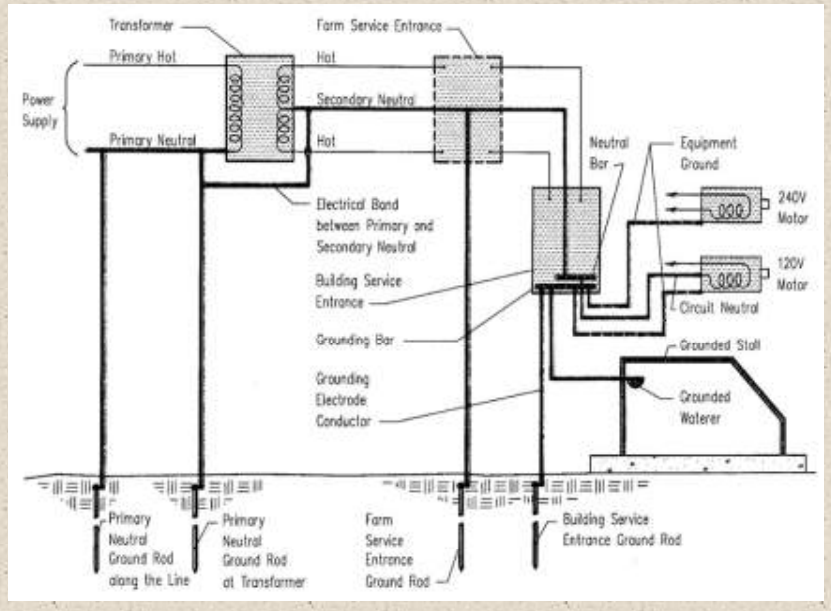


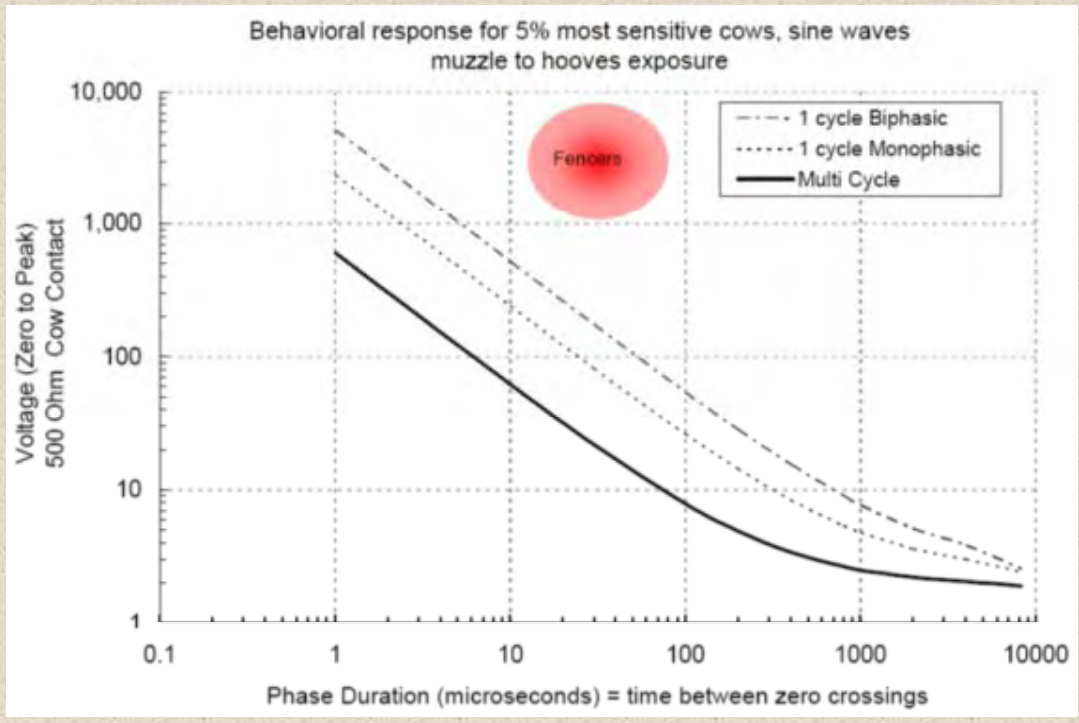
Figure 1. Grounded Neutral Single Phase System, some hot wires not shown for clarity (from Midwest Plan Service Handbook Number 28).

Dr. Steve Carlson, DVM and Dairy Producer, SE Iowa

“Be careful out there”… sage advice when it comes to the vagaries of stray voltage

The bad news is… very few people around the country have the equipment, skill and fortitude to chase down the really difficult-to-find and often multiple source situations.

Contact John Conway at 607-547-2536, ext. 237 or jfc6@cornell.edu to get Dr. Carlson’s list of qualified people.



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Questions??